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The City Limits

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and
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The city limits actual observation in the study of natural science. This is true in the consideration of earth science, stars, and plants and animals. The child or science student in an urban area does not have much opportunity to follow nature firsthand. Yet an entire class of Chicago Teachers College students has had the joy and scientific stimulus of communing intimately with nature inside a half circle whose radius extends only 10 to 20 miles from the Loop.* This has been made possible by the joint efforts of Dr. E. C. Colin of the college and Dr. David Thompson, senior naturalist of the Cook County Forest Preserve District.

Chicago is in possession of, or has the use of, Lake Michigan, a magnificent park system with gardens, conservatories, museums, and zoos, and finally the extensive forest preserves. These like the other facilities are open to the public, free, at all seasons, and for any reasonable use which is not contrary to the general interests or welfare. Of all these opportunities the forest preserves are the most usable for the study of natural history. This is true because the various accessible areas encompass all types of local habitats and wide areas are virtually undisturbed. Few exotic or strange biotic influences which might affect the ecological relationships have been deliberately introduced.

With the consent of the dean of the college and the department of science an arrangement was made for the forest preserve district bus to convey college students on a series of Saturday field trips. These trips which lasted all day were conducted under the direction of Dr. Thompson accompanied by Dr. Colin. The bus driver was also a forest preserve naturalist. Lunch was carried by members of the party and the noon

* The loop is the heart of the Chicago downtown district, libraries, shopping center, amusements, hotels and restaurants.

hour was used to recapitulate and summarize the activities and finds of the morning. Additional excursions were made during the afternoon, which sometimes involved a change by bus to a more distant locale.

The course was designated officially as *Field Biology*. It was organized to last only six successive Saturdays. No one was sure how our students would respond to unaccustomed Saturday classes, especially as the season wore on and the weather became more rigorous. Fall was chosen both for seasonal considerations as well as for the convenience of the forest preserve district naturalists who are heavily burdened with day camps in the spring.

I. Prairie, September 24

The first day was used in examining an untouched or virgin prairie of several hundred acres lying between the Santa Fe right of way and the Des Plaines River near Hodgkins. Emphasis was laid on the differences between prairies and forests in respect to soil, plants and animals, and in their history. Each student selected one of several possible group activities and directed his efforts in a single concentrated field of study. Soil, plants, birds, arthropods, mammals, and amphibia and reptiles were the groups given particular notice. The bird study students saw at least one example of blackbirds, meadowlarks, pheasants; and along the stream, spotted sandpipers, cedar waxwings, kingfishers, and bluejays, were observed. On other recent occasions prairie chickens have been seen here. The plants included characteristic fall flora with a few comparatively rare prairie wildflowers. Arthropods found were mostly insects and spiders. A few common snakes and amphibia were taken. Mammals were not plentifully in evidence.

II. Seed Dispersal, October 1

The second Saturday was devoted to fruits and seeds, and to seed dispersal. The class took a leisurely hike of 3 or 4 miles through the gorgeous autumn colors of the hilly, picturesque Palos landscape. This was the day we *saw five bald eagles* soaring in overlapping circles as they searched the countryside. The students collected and sampled, by tasting, wild fruits, including crabapples, haws, wild grapes, elderberries and wild cherries. Honeysuckle berries, acorns, walnuts, sticktights, spanish needles, hazelnuts, sumac berries, and others were collected and their uses discussed. Mrs. Colin made some wild crabapple jelly which was served at lunch during our last meeting. No food of the gods could have evoked more gustatory appreciation.

III. Aquatic Biology, October 8

On the third day, nets, seines, and hip boots were in order. The usual quota of students went in over their shoetops and one gal slid sitting down a clay bank into a small lake. Bass, sunfish, golden shiners, bullheads, various minnows, and aquatic insects both adult and larvae, crustaceae, and arachnids were collected. Several different types of aquatic plants were taken back to the laboratory. Gambusia, the mosquito fish, which has been introduced into some of the forest preserve lakes were also taken to be used as aquarium fish in the biology laboratories in the college as well as in some elementary schools.

IV. Forests, October 15

Many trees and shrubs were identified and a visit was made to the tree nursery operated by the forest preserve district. Only native trees and shrubs are planted. These when sufficiently large are transplanted to suitable locations. The students were intrigued by some of

the methods of shelling out seeds from the fruits; for example, black locust seed pods were crushed with an old coffee mill and the pods winnowed away with a strong air stream.

V. Fossils, October 22

The fifth day was taken up by a visit to the largest quarry in Cook county. The pit extended down about 100 feet into the Niagara limestone formation. Most of the day was passed in searching for and cracking out fossils. These included various corals, polyzoa, brachiopods, cephalopods, pelecypods, gastropods, crinoids, cystoids, trilobites, and a few evidences of plant remains, apparently kelps. These fossils were used as the start of a reference collection for the college, and were given date, location and name labels. They were also accompanied by labels giving the name of the students who collected them.

Some of the students also noticed the beginning of plant invasion in locations which had not been recently disturbed, and the first stages or steps of soil building.

The quarry was divided. The two pits were connected by a long tunnel which passed through the solid rock under US Highway 66. Our students found this of great interest and examined the walls carefully, and eyed the roof dubiously. In the smaller, newer, part of the quarry, operations were not active and cliff swallows were apparently just establishing themselves.

VI. Aquatic Birds, October 29

The last day was given over to a study of aquatic bird life at Orland Wildlife Refuge. The sheet of shallow water known as Orland Lake (and also as McGinnis slough) covers approximately 314 acres. The refuge includes about 875 acres, from which 249 species of all types of birds have been listed. The forest preserve naturalists have banded nearly 40,000 waterfowl here. Mr. John Jedlicka, the naturalist who carried out this banding for eight years, accompanied us, described the methods used and gave a summary of the results. On this day the waterfowl population was extensive. An estimate was made that 1200 geese were present of which there were approximately equal numbers of canadas, snow and blues. Other birds identified were coots, mallards, black ducks, pintails, blue-winged teal, wood duck, greater yellowlegs, semipalmated plover, killdeer, merganser, great blue heron, barred owl, chickadees, downy woodpecker, slate colored junco, crows, and sparrows. Along the shore, in the mud, tracks of several mammals were evident. These included coon, mink, muskrat, and fox.

Vegetation grew up to the margin of the slough. Many of us carried back the blonde seed tufts of reed grass. This tall grass stood swaying in the breeze like a host of slim platinum haired beauties.

A short excursion was made into neighboring fields and uplands. Here were excellent studies of soil erosion showing bare spots. Soil building was also occurring; there were small areas which were similar to tundra, with lichens, moss, and other invaders evident. Natural seeding received considerable impetus from the various seeds which became attached to our clothes, as well as when milkweed pods were rubbed between our hands and tossed into the wind. We found an Indian arrowhead and a few other artifacts, as well as some small rock material which had been brought in by glaciers. A pile of debris yielded several live deer mice.

The work has proved so interesting that several students have brought

friends, husbands, or younger brothers and sisters along. The teachers from the elementary schools brought their own children.

Can you imagine the impact of these experiences upon city bred students many of whom have scarcely been off a pavement except in parks or beaches? They have had the fun of roughing it, and of dressing picturesquely and comfortably for the out of doors. They have seen a new view of life through the cooperation of two publicly maintained organizations. Their interest and learning was stimulated at no additional cost to the college, the forest preserve district, the students, nor the public. These college students are future teachers in the public schools. Their enriched knowledge of natural history and wild life will benefit themselves and children and citizens of this entire area. At least two members of the class are already teaching. One of these teachers has arranged for a forest preserve district naturalist to come into the school auditorium for a general assembly. Another is negotiating for the same privilege. Obviously the field trips have been of incomparable value to these in-service participants. Teachers with field experiences can be more convincing on the basis of first hand knowledge. They can understand and portray relationships between living organisms, and between themselves and the non-living world.

Such a field course gives teachers confidence in their teaching and in themselves. They have something extra to bestow and to share with their pupils. Here is something beyond the classroom and more thrilling than textbooks. The spirit of the out-of-doors comes into the classroom and the confining walls vanish. The children too experience the fierce glare from the searching eyes of those circling wild eagles. The pupils know the glory of the countryside painted in a thousand shades of color as the hills roll off yonder beneath a clean blue sky. They hear the cries as a lake comes to life and flaps in a wheeling noisy, black, silverstreaked, cloud of waterfowl above them. They watch a feather drift lazily down to be drowned among the sparkling wavelets which almost seem to dance along the classroom floor.

It is our hope that this class will be repeated many times both in our regular session and in summer school. The summer offers unusual opportunities for regularly assigned teachers who might find it difficult to go out on Saturdays during the regular school year. In fact the summer situation is readily adaptable as an in-service function, as is the fall course.

Other teaching possibilities and relationships between the board of education and the forest preserve district can be readily developed. Some of them hold great expectations. One of these is a Cook County Teachers Field Station. Who would not love a summer's residence in the woods, studying nature, and still only 20 miles from the Loop?

Chicago Teachers College takes this occasion for expressing its appreciation and congratulations to Mr. Charles G. Sauers, General Superintendent of the Cook County Forest Preserve District, to Mr. Roberts Mann, Conservation Superintendent, and to Dr. David Thompson, senior naturalist.

The city limits, no longer, the biological field experiences of Chicago City College students nor Chicago teachers.

Biology for Survival*

D. F. MILLER
Ohio State University, Columbus, Ohio

The very acceptance of the word "survival" connotes the belief that extinction is possible. As individuals we expect to become extinct; as a group of organisms we hope to survive.

At best calculations it is usually conceded that there must be living today at least a million species of animal life. Yet this great number is, perhaps, but a handful compared to the vast hordes that have lived and become extinct in all the past ages of the earth. The brief notations in the earth's own fossil dairy are interpreted to us by paleontologists as indicating that there have been eras in the past, some of them millions, of years in length, when certain groups were very abundant both in number of species and number of individuals. There was the age of mollusks, the age of great reptiles, the age of fishes. Thousands of species in these larger groups were abundant enough to leave many fossils but they are now extinct. How many more may have existed but have never been found?

We do not know where life came from nor when it began. We do not even know *if* it ever began. When that statement is made to a group of students they always look up with a puzzled expression. They say that if life exists today it *must* have had a beginning; everything had to have a beginning. But when asked if it is not quite possible to think of life as continuing on down through the future for eternity, they agree. We have thought of this for most of our lives. If life can exist from the present to infinity in the future, why could it not have existed from the present to infinity in the past? Most persons struggle with this idea, but only because it is new to them. So we do not know where or when life began or *if* it began, but we do know that it has existed in myriad forms from ultramicroscopic viruses and phages to giant saurians and whales. We *do* know that many more forms have become extinct than have survived, and can assume that many forms now extant will become extinct. Are there reasons to believe that man will be different from the rest?

Man is an organism, composed of cellular units, and chemical compounds like other organisms. *Man is a mammal,* a member of a special group of organisms. He has hair and milk glands, reproduces, rears his young, carries on body functions, and dies like the others. *Man is larger than most animals,* but smaller than some. *Man is stronger* than most animals, but weaker than some. *Man's life span* is longer than most animals, but shorter than others. *Man has many generalizations,* but a few specializations.

A horse has a highly specialized foot. Only one toe remains; bones have disappeared and the nail has become a hoof. These are good weapons of defense and offense and an excellent means of rapid transit over long distances. But a horse cannot play a piano or finger the strings of a violin, or paint a picture. Man cannot claw with the tiger, or bite with the wolf, or fly with the bird, or swim with the fish. He lacks the appropriate specializations to do this although he possesses the same basic structures. But he can make a sharp headed spear that will slay the tiger and the wolf; and he

* Presented before the sectonal meetings of the National Association of Biology Teachers and Detroit Biology Club at Cranbrook Institute, Michigan, November 19, 1949.

can make a plane that will carry him more swiftly than the bird; he can sail a boat, build a wagon, and train a horse to pull him or let him ride, because his generalized hands are guided by an extremely highly specialized brain. He has a high degree of intelligence.

Yes, man is intelligent. But is this kind of intelligence sufficient to guarantee his survival? He has memory of personal experience. This memory of personal experiences modifies his behavior. Through memory he can project his thoughts into the future by what we call imagination. Apparently some other animals have this type of intelligence, but in no case has it remotely approached the degree of development and specialization that it has in man.

There are other types of intelligence that have done much to guarantee the survival of certain other forms of animals and we know but little of how they work. You have watched a bird build its nest. It begins by placing a few blades of dead grass in a rather haphazard fashion across the fork of a limb. Before long a neat and fairly firm little bowl exists. Mud may then be gathered. Mud, with just the right consistency, rolled into a ball. This is spread around and pressed into the straws and sticks and then shaped and smoothed out. When dry a much more perfect nest results. That bird did not learn its trade in school nor did it serve apprenticeship with a bird nest-builder. It probably never watched another bird build a nest. How did it know when, and where, and how to build the same kind of nest that its ancestors built, and to do as good a job as they had done?

You may have sat and watched a mud-dauber bring bits of mud to a spot beneath the eaves of a building and gradually form them into a tubular cell. Always when the cell reaches a certain size the mud-dauber flies away and returns, not with more mud, but with a spider which it crams into the cell. After this she lays an egg in the cell. One egg, mind you, not a dozen or a hundred. After that she brings more mud and seals the opening of the cell. When the work is done she flies away and may never return. The egg hatches. The tiny mud-dauber maggot feeds, grows and pupates in the dark recesses of its cell. One day it emerges and bursts out into the world with its great array of new things. It is adult. It needs no care or direction. It breeds, feeds, and builds another nest in exactly the same manner and sequence as its parent. How does it know where and when to build, what stuff to use, how to form the cells, how many eggs to lay, and what the offspring will need for provender? We call it *instinct,* inborn or inherent patterns of behavior. And so they must be. Surely they were not learned as we learn. It gives me an great deal of respect for and confidence in the facts of heredity.

These things have made for survival in the organisms that have possessed them. Man's intelligence is one of experience, primarily. He once slipped on rounded stones or dragged a heavy object over rounded sticks and found that it was easier that way. After much experience someone invented the wheel and lever, and built a wagon, a simple machine. But all of this would be lost to *his* offspring if he did not *teach it* to them. Thus teaching becomes one of the most potent factors in the survival of the human race. We should never lose sight of this fact. It should be a source of inspiration and a stimulus to every teacher to do the very best job he knows how.

Man has emotions. These emotions govern his behavior even more surely than does his intelligence. The survival of mankind may well rest upon the outcome of the struggle between emotional-

izing and rational thinking. When someone says he thinks, he likely should say that he feels. He usually believes *what* he believes because it feels better to believe this way rather than that. Our lives and our actions are often controlled by fears and hates, by love and pity, by sex emotions, by love of adventure and excitement, by curiosity, pride, shame, and remorse. We fear mostly those things which we do not understand. Some have a fear of wild animals, or a fear of people, or a fear of darkness, or a fear of a beautiful display of northern lights, or a fear of storms. One of the most common fears is fear of the disapproval of others. This may be a very useful means of controlling the behavior of young children but it should never be stretched beyond the truth nor used to the extent of creating timidity or excessive shame.

The possibility of man's eliminating himself because of fear and hatred of others has been discussed frequently. Surely he is rapidly creating the means of doing so and in short order; with split atoms and supersonic flight not to mention surface vehicles that creep along at 60 to 90 miles per hour, killing thousands each day. With all of this goes an attitude of complacent indifference. It is man's specialized intelligence that created these instruments and it might be that specializations will cause *his* elimination as they have some other groups of animals.

It does not seem to me, however, that he is in so much danger of murdering himself as he is of loving and pitying himself out of existence. As fine as these emotions may be, they are also the most subtle and dangerous to which we are exposed. Fear and hate repel, but love and pity embrace. We pity those who are unfortunate and strive to alleviate the wants and sufferings of those who cannot do so for themselves. This seems to be largely a human trait. In the ruthless realm of nature and primitive organisms these individuals would be eliminated and only the strongest of body and keenest of mind could survive long enough to produce their kind. But with our human attributes we love and pity these individuals, especially. We preserve them above all others. We house, clothe, and feed them, and very often we allow them to reproduce. This we often hear excused on the grounds that they have as much right to love and have children as anyone else, perhaps more. Thus do we leaven the lump of humanity with the ferment of incapability. We have been taught to feel good when we do these things and we like it so much that we do more and more of it until the problem grows greater and greater, consuming our strength and resources. Rational thinking tells some of us that this is wrong and should be controlled. It can be controlled, and with kindness and sympathy. But our mores, our social and religious teachings often forbid. We are trapped by our emotions and we bid fair to enslave ourselves by our folly. *These things we must teach if we are to survive.*

Love of adventure and curiosity are the twin emotions that have sent our ancestors out over the lands to strange places, across the seas to new lands, into the heart of jungles, up into the stratosphere, and down into the bathosphere. It urges man to pry into the secrets of nature and loose the power of the atoms. He has sought for the infinitely small and the infinitely great. His knowledge of power and speed may even free him from the earth itself, if it doesn't eliminate him from it first. The numbers that we slaughter each week would bring us to war if done by any power except ourselves. We pay little heed to the ratio of cars driven to density of population, or the ratio of speed of vehicle to the

speed of reaction of pedestrians. This man-made reducing agent is not improving the quality of the race.

Sex emotions are among the most powerful influences determining individual and social behavior. Here, perhaps, more than anywhere else is there need for appreciation and understanding of the real meaning of the emotions. So much of health and misery, so much of human happiness is interwoven with these emotions and relationships that to neglect their understanding is to court a lifetime of disaster. Why should shame and guilt be draped about those acts and emotions which lie at the very threshold of life itself? Why should the sex relationships be approached by so many with fear of physical anguish or mental disgust? Why should the idea of sin—and sin *is* an idea—be linked with those emotions which are often indistinguishable from love? When the subject is openly approached with groups of students one almost invariably finds a sane, sensible, and serious frankness in the response of young people. Of course, such training and education should not have to start with high school or college. It should begin long before school age and in the home. A child's frank and innocent curiosity should never be rebuffed or hushed and it takes little techincal knowledge on the part of parents to satisfy this curiosity. *These things also we must teach.*

Man cannot live without his emotions and remain human, nor would he wish to do so if he could. Man can learn to understand them and their causes; learn to reduce their damaging effects and to benefit from their good. But he *must* learn their control if he is to survive. Rational thinking and knowledge of the truth are the strongest instruments at his command.

The legendary gold of King Midas was scarcely pin money compared to the great wealth of the country in which we live. We take a natural pride in our wealth, but sometimes I am inclined to believe that we feel just a little embarrassed by it and try to overcome that feeling by handing it around freely to those who have less. Let us not count the same dollar too often in calculating our wealth. It should be apparent to all that the real wealth of a nation lies in its natural resources. You don't *create* wealth—you *grow it* or *dig it* from the earth. A good example of this is iron. The ore as mined is worthless unless it can be smelted, molded and wrought. But the real wealth of a nation in iron is measured in the amount of ore it has, not in the number of times it can be handled or resold. Since we are continually finding new sources of natural wealth we are never entirely certain what it's limits are. The tremendous source of energy brought to light by the process of atomic fission cannot yet be estimated. We may not *know* the limits of our resources, but there *are* limits. As Americans we are rapidly consuming many of our resources and we seem to be heedless of the fact that some parts of the earth such as India, Africa, Brazil, are potentially many times richer in natural resources than we are. Time was when the resources of the British Isles were more than sufficient to take care of the needs of its sparse population. In the tenth and eleventh centuries it must have seemed that it would always be so. But populations have a way of increasing by geometric proportion and it was not long before the British found that they had outgrown their resources and their ability to produce. They became explorers and colonizers, and from other parts of the earth resources came pouring into the little islands making it possible for the population to continue to grow unhampered. As early as the time of the French Revolution, Napoleon

realized that if he could blockade the British Isles he could speedily bring the proud little nation to submission.

The British knew this as well, but their answer was to build stronger navies and larger merchant fleets to bring more resources from outside. They spoke of trade routes as "life lines". Additional resources only made possible further growth of their population. Planned and forced emigrations could not stabilize their numbers. We have heard many reasons given for the present tragic situation in Britain but seldom an admission that it is due to too many people.

China and India are among the most heavily populated areas of the earth, an estimated population of between seven and eight hundred million persons. Their biotic potential is tremendous and their population pressure is correspondingly high. We hear of thousands of people starving to death each year and other thousands dying from plague and pestilence which might be controlled. In very unfavorable years hundreds of thousands perish. This is a natural consequence of such a reproduction rate and is a natural control. It has operated there for thousands of years. In smaller degree the situation exists in all overcrowded areas of other countries. All that is needed to starve thousands of New Yorkers is to tie up their transportation system for a few weeks. Yet we grow violently emotional about the unfortunate Indians around Calcutta who are in danger of starvation unless we supply them with necessities and we set up our own international "Give-away Program". We love that magnanimous feeling of dispensing charity to our poor relations. I am *not* criticising our attitude of charity— I *am* criticising our method of squandering our own resources in a manner that increases *their* problem year after year. Those who do not starve reproduce, and increase their and our burden. Population control is the reasonable solution.

It became popular recently for us to condemn Great Britain for removing wealth from India where it had lain for thousands of years while the inhabitants starved, and to condemn Holland for doing likewise with her insular possessions. But we think that it is wonderful for us to give away our own irreplaceable resources by the billions to peoples who will learn to demand them, and sometimes to those who may use them in an attempt to subjugate us in another war. If we are to survive we must first learn to control our emotions by thinking objectively and acting accordingly, and by teaching others to solve their own problems in a similar manner instead of using stop-gaps.

In our school we teach a general course, one topic of which deals with the relations of organisms to their environment. The subject is introduced by placing on student tables, aquaria with water, sand and plants. At the beginning one fish is added to each aquarium and a discussion follows on the problems of survival for an organism in a limited environment. Next a number of fish are added. The same problems are intensified and new ones arise. Then a variety of other organisms increases the population creating new problems and, finally, blood sucking leeches are added. Soon a tadpole, a frog or a turtle will die, then another and another. The aquarium becomes foul with pollution. This causes other deaths. From these illustrations we discuss most of the problems of ecology and many of the problems of sociology, and show that the problems of sociology are biological and need to be so treated. Much of the present social teaching seems to be directed toward preserving the unfit and allowing them to pollute the germ plasm

of the race, with traits that are hidden and impossible to eliminate.

Heredity, selection and isolation have molded the human race in its development and will continue to do so in the future. It seems that when the primitive human stocks became crowded they migrated radially into different parts of the earth. They became isolated, inbred and were strongly selected by the varied forces of environment. Thus different species and different races of mankind were cradled in different parts of the earth. I feel that it is unfortunate that these differences did not become great enough to create species incapable of interbreeding. Within such groups there have always been differences among individuals. Wherever great things have been accomplished there have always been great individuals—peculiar genetic combinations that have risen above the level of the common or average. Historians usually attribute the rise of the Roman Empire to the dominant and stalwart characteristics of the early Roman race, and its fall to the softening of its people by luxury and lack of hardships. But in its glory Rome attracted the less capable and less substantial people from without its borders who flocked into Rome. Slaves were imported and bred their kind. Many old line Romans bred freely with imported concubines and so diluted the germplasm with inferior stock that Rome fell an easy prey to the hardy, inbred, and highly selected tribes around her. *What are we doing to prevent a similar fate from befalling our own race?* In livestock breeding we are concerned over sires and dams. We study the conservation of wildlife, forests, minerals and soil. But we allow our leadership stock of human beings to slowly disappear by slow breeding, while the incompetent increase by leaps and bounds depending upon the more competent for nurture and protection. Today we live in an era of concern for the incompetent. We hide their incompetence by calling them "underprivileged". They should not be looked down upon nor denied their rights, but we have almost reached a condition where one has to be underprivileged to have any privileges. I should like to read a short quotation which expresses it better than I could do.

"We believe in equal opportunity for all, but we know that this includes the opportunity to rise to leadership—in other words, *to be uncommon.*

"It is a curious fact that when you get sick you want an *uncommon* doctor; if your car breaks down you want an *uncommonly good* mechanic; when we get into war we want an *uncommon* admiral and an *uncommon* general.

"I have never met a father or mother who did not want their children to grow up to be uncommon men and women. May it always be so. For the future of America rests not in mediocrity, but in the constant renewal of leadership in every phase of our national life."[1]

We used to teach much of this kind of philosophy. I have heard little of it in recent years. It requires clear, scientific, objective thinking. Thinking objectively is the highest function of intelligence. Furnishing training in doing this is the highest duty of education, and the prime responsibility of educational institutions. These things we must teach if we are to survive.

[1] Herbert Hoover—"Whose Century Is It?", Reader's Digest, August, 1949.

LETTERS

Dear Dr. Breukelman:

I know that your space for announcements is limited, but I have a news item that may be of considerable interest, and of profit, to readers of *The American Biology Teacher*. I understand that members of the NATIONAL ASSOCIATION OF BIOLOGY TEACHERS would write more popularized versions than they do at present of their biological researches, or of their teaching methods and experiences, if they had greater outlets for such material.

For the first time in its 50-year history, *Audubon Magazine* is paying from $15.00 to $75.00 for all accepted articles ranging, preferably, from about 1,500 to 2,500 words long, although both shorter and longer material may be acceptable. Payment for the one-time use of all photographs within the magazine is $3.00 each with a credit line to the photographer; $10.00 for each cover picture. Photographs or sketches are desirable, but not necessary.

The magazine now has a readership of 35,000 which is rising steadily and reaching an increasing number of people. This is creating a demand for more popularly written articles that will make wildlife research and wildlife conservation both interesting and understandable to those outside the biological field. This does not mean, however, that articles should be "written down."

The editors are particularly anxious to get good *popularly-written* articles on mammals, birds, and other wild creatures and their relationships to their environment; wildlife management articles; popularized reports of wildlife research; articles about wild animal pets; personalized animal biographers; wildlife of a particular region: articles on local wildlife conservation projects; picture-articles, or illustrated-text of animal tracks, habits, etc., marine life, birds, flowers, etc.; *biographical sketches of living naturalists are particularly desirable;* "how-to-do" articles on wildlife photography; how the amateur can make contributions to science, establish a sanctuary, community forest, school nature project, etc.; also, personal experience articles in attracting wildlife (supplying food, water, cover, birdhouses, etc.).

Payment is on acceptance and reports will be made to authors within two or three weeks.

Sincerely yours,
JOHN K. TERRES,
Managing Editor, Audubon Magazine,
1000 5th Ave.,
New York 28, N. Y.

Dear Dr. Breukelman;

This letter has been postponed many times, but I feel impelled to write it after the New York meetings and in view of past experiences.

1. Our constituents seldom or never show any concrete appreciation for articles written for ABT or for papers read at meetings. I have written 3 or 4 papers which have been published in ABT but have received "nary a posteard" indicating that anybody read or received any benefit from any of them. Your reprint of my article indicated that many did get some benefit, but they kept it a dark secret from me. I have been guilty of this same offense. Could you suggest that people use the penny posteard to tell writers when they have helped? It might serve to spur others on.

After the New York meeting I wrote to two of the speakers and requested a small bit of additional information. No reply from either. I indicated my interest in their talks, also. Are these talks just mechanical, or attention-getting devices, or are the speakers really interested in helping to improve teaching?

2. Where are the articles on newer practices in Biology teaching? There must be many biology teachers in the United States who have broken away from the lock-step of lecture, demonstration, text assignment, recitation as a regular classroom diet. We should have articles on this theme coming out in every issue as well as methods of evaluating attitudes, appreciations, critical thinking and problem-solving methods, and other goals of biology teaching not covered under subject matter. This field also must be under consideration by many teachers.

This is offered in the spirit of "light."

Sincerely yours,
Name withheld on request.

NEW ADVISORY STAFF MEMBER

At the Representative Assembly meeting in New York City, Mr. C. M. Goethe, Sacramento, California, was unanimously elected to serve on the Advisory Staff of *The American Biology Teacher*. Mr. Goethe, a charter member of the NATIONAL ASSOCIATION OF BIOLOGY TEACHERS, brings to the Association the experiences of a career rich in service to his fellow men. Among others, he is a business executive, world traveler, and pioneer in movements such as playground, city planning, and garden clubs. He is the author of numerous newspaper and magazine articles dealing with business, civic, and scientific subjects. Also, he has written many books including *Seeking to Serve, Sierran Cabin From Skyscraper, War Profits and Better Babies,* and *Geogardening*. A review of the latter book appeared in the January, 1949 issue of *The American Biology Teacher*. Mr. Goethe writes and publishes a Eugenics Pamphlet, eugenics being his major scientific interest. His slogan through most of his life has been, "Reduce Biological Illiteracy In the United States of America." *The American Biology Teacher* cordially welcomes Mr. Goethe into its official family.

BROTHER RAT

When man finally rockets to the moon, the chances are that Brother Rat will accompany him. This was the prediction made by Charles D. Thurmond of Monsanto Chemical Company in a recent talk before the Pacific Insecticide Institute during which he reviewed the progress made during the last ten years in discovering and perfecting rat poisons.

He pointed out that for centuries man's greatest defense against the rat was witchcraft. He cited the custom of "rhyming rats" in ancient Ireland and Scotland. One of the charms to get rid of the rats was to beat loudly on a skillet, Mr. Thurmond said, and at the same time to shout

"Beat for the rats.
Beat for the rats.
Go to so-and-so's house.
There is a bridge to pass."

Poison is the most efficient means of destroying rats, Mr. Thurmond said. He described ten rodenticides (rat killers) which are generally used. Six of them, he said, were in common use prior to the war. The remainder were directly or indirectly the result of war-inspired research to obtain adequate battle-area rat control.

A new rodenticide, which Mr. Thurmond said will soon be available, is known as Compound 42. It was discovered during cattle disease studies made in the Department of Biochemistry at the University of Wisconsin. Compound 42 is a tasteless and odorless substance which causes rats to die of lung hemorrhage.

One of the best rodenticides, Mr. Thurmond said, is Compound 1080. In discussing its use, he emphasized the need for extreme caution and pointed out the rigid precautions taken by his company and government officials in controlling 1080's distribution and application. It is available only to professional exterminators and government agencies.

Other "ratistics" given by Mr. Thurmond:

There are more rats than people in the United States—155 million rats to 150 million people.

The rat has caused mankind more trouble, more expense, more suffering and more death, than all the wars combined.

The annual damage caused by rats has been estimated at $500 million, mostly in agricultural products.

Rats destroy and eat as much food each year as 265,000 farmers produce in the same period.

BIOLOGY LABORATORIES

By The "Old Fossil"

TURN OF THE HALF CENTURY. Not for its present news value but for the record we say this about biology. The biology course seems to be firmly established in the secondary school curriculum. It is one of the newer courses to be added; generally considered as a two semester, second year course.

TWENTY FIVE YEARS AGO. It was about this time when biology as a course was sired by the mating of the father zoology and mother botany. Prior to this, these two courses were offered as one or two semesters each and in sequence. I started my first biology class using the Kinsey text as my sole guide. My university training never did include a course of instruction in biology as such. The *Hegner* text dominated the field of zoology and *Bergen and Caldwell* was tops in botany. By the late twenties many good texts in biology appeared. Biology laboratory manuals were common but gave way to the present day workbook.

WINDOW DISPLAYS. *Valpariso, Indiana,* November. The J. C. Penny store window had an exceptional leaf collection put in by the high school. Instructor Miller was the biology sponsor of this biology student project. Instructor Roberts was in charge of the manual arts work connected with making the covers. The covers consisted of individual work and design in metals, plywood and leather.

Plymouth, Indiana, November. Our practical biologists, the 4H, had a display in Nellans Electrical Appliance Shop. They had a fine display of seeds of grain and other related articles grown by the students in the summer of 1949. One article that I remember was a small red ear of popcorn about two inches long.

IF YOU ARE A GARDEN FAN or give some instruction in this in your classes write for the following: Hollenbach's Seed Store, 808 West Lake Street, Chicago, has a good garden bulletin, *What When How Helps.* It is free. The editor who signs himself as "The Seedling" is Walter Juengling. He certainly does a nice job in this bulletin.

THE BOY IN THE REAR of the room was no dummy. He had a pair of field glasses reading the fine print on a front room class chart. Perhaps you can put your pair of glasses to similar advantages in class room laboratory and other places. You can see things besides birds.

LAB FEES. Many schools collect a lab fee from each student for biology incidentals. The prevailing charge seems to be twenty five cents. Some charge much more, others less. This money is used to supplement the purchase of materials regularly furnished by the Boards of Education. If you do not collect a fee and would like to, consult your principal about the idea. Such fees should be handled as all other school funds.

DETROIT. From a letter from C. L. Thiele, Divisional Director of the Exact Sciences of Detroit: "At the present time a committee of Detroit senior high school science department heads are making a thorough revision of the science supply and equipment list." This is a worthy attempt to bring purchases up to the present day offerings. Many school lists are cluttered with materials listed years ago and now have doubtful value. They do not keep abreast of the newer developments. We sincerely hope Detroit not only prepares an up-to-date list of supplies and equipment but also maintains flexibility for additions to such listings which may later prove of value.

"THINGS OF SCIENCE" a service supplied from the Science Service Building, Washington 6, D. C. One years' subscription $4.00. Each month a blue package of actual objects of science is mailed to the subscriber. In the past "Things of Science" units have included: new plastics, coal-by-products, new insecticides, petrified wood, chicle, vegetable dyes, together with sheets of explanatory comment, written by scientists. Museum style cards are furnished to identify each object, so that exhibits may be set up.

TEACHING AND EXPERIMENTATION. At least two firms are experimenting with new teaching devices at the present time. This is quite a task. Experiments must be conducted to determine the know-how. Another set of tests must be conducted to transfer this know-how to a production basis. Then protection of patent and copyright procedures takes more time. I will give you more information regarding these two projects soon. In the meantime it is the Old Fossil at 5001 N. St. Louis Avenue, Chicago 25.

NEW OFFICERS

The results of the election of officers of THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS for 1950 have been received from the secretary-treasurer. The elected officers, who have assumed their duties as of January 1, 1950, are as follows:

President: Betty Lockwood, National Foundation of Infantile Paralysis, 120 Broadway, New York 5, New York.

President-elect: Richard L. Weaver, Program Director for the North Carolina Resource-Use Education Committee, 9 Rogerson Drive, Chapel Hill, North Carolina.

First Vice-President: Harvey E. Stork, Professor of Botany, Carleton College, Northfield, Minnesota.

Second Vice-President: Dorothy C. Miller, State Teachers College, Cedar Falls, Iowa.

Secretary-Treasurer: John P. Harrold, 110 East Hines Street, Midland, Michigan.

The new president needs no introduction to readers of *The American Biology Teacher*. She has been an active member of the association and a contributor to the journal from the beginning. Among her specific contributions have been service on the editorial board, guest editorship for a special issue, and membership on many important special and standing committees. She has attended most of the national meetings of the NABT and has made important contributions to their success. She is well known throughout the country for her work in health education and, more recently, in the National Foundation for Infantile Paralysis.

Biographical sketches of the other officers appeared in the November issue. All of them have been active members of THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS, having served on many different committees and performed many special duties. All of them are leaders in science education in their respective areas. All of them have broad interests and experiences that enable them to see the larger problems of science education as well as the immediate problems of the classroom. The editorial staff extends on behalf of THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS and *The American Biology Teacher* sincere congratulations and best wishes for a happy and constructive year.

UNITARY SCIENCE

"A new unitary science comprising physics, biology and all other sciences of man" is developing, and will give rise to a new conception of man and a new basis for ethics, Dr. Lancelot Law Whyte, British scientist, believes. At a recent meeting of the Cooper Union Forum, Dr. Whyte declared that "we are at a dramatic moment in the development of science when it seems that a scientific synthesis covering matter, life, and mind is beginning to appear. Nineteen hundred and fifty is perhaps the crisis of transition from an analytical mechanical physics of the inanimate realm to a unitary science comprising physics, biology, and all the sciences of man. This new comprehensive science will be humane, and balanced, and will give rise to a new conception of man and a new basis for ethics.

"Physics may be regarded either as physical invention, or as discovery of fundamental principles. In the past two centuries the main impact of physics on society has been through mechanical invention; in the immediate future the impact of new physical ideas will be even greater. The discovery of the universal principle to new unified science would constitute the positive moral counterpart to the atomic bomb.

"We are moving in the intellectual world from a period of undue emphasis on analysis with a resulting discrimination of knowledge to a period of synthesis. Science ceases to be ethically neutral when it approaches man."

Dr. Whyte was chairman and managing director of Power Jets, Ltd., which made the first successful jet-propelled plane in 1941. During the War he was Director of Statistical Inquiries for the Ministry of Supply in London. He is at present privately engaged in theoretical research.

Reviews

HOWARD-JONES, DR. N. (Editor). *Applied Biophysics.* A Symposium. Chemical Publishing Co., Inc. Brooklyn, N. Y. vii + 293 pp. illus. 1949. $6.75.

Applied Biophysics is a symposium by 17 leading British scientists contributing to a survey of the physical methods used in medicine. As many of the diagnostic and therapeutic procedures in medicine and surgery are based on the elementary principles of physics, the work of the radiologist, physiologist and biochemist are correlated with the physicist in the speciality of biophysics. As Dr. Andrew H. Dowdy, of Rochester, New York, so aptly states in the foreword, "the biophysicist is frequently a catalytic agent, facilitating the successful progress of a coordinated research program."

This 293 page book brings the specialized research of many authorities towards the solution of such specific problems as the biological effects of penetrating radiation, the biophysical factors in drug actions, an extremely interesting chapter on genetic effects of radiations, several chapters on the technical methods in X-Ray and radium therapy and a chapter on histological analysis of radiation effects by Alfred Glucksmann, M.D., to mention a few.

This book would be very appropriate for high school and college libraries. Physiologists, biologists, and physicians wil enjoy the review of old and the presentation of new biophysical material.

CHARLES C. HERBST
Beverly Hills High School
Beverly Hills, California

MARX, DAVID S. *Learn the Trees from Leaf Prints.* The Botanic Publishing Company, Cincinnati. 42 pp. illus.

This is the 7th printing of Mr. Marx's collection of leaf prints from 194 common trees of the Central and Eastern states. The prints are arranged by related groups on 34 plates so that it should be possible to recognize almost any leaf found in these regions by comparison with the prints. The purpose of the book is to supplement personal instruction where available and to make the study of trees attractive for those who find more technical information difficult and tedious. Most of the prints are extremely distinct and the venation is well demonstrated. They represent typical leaves from the trees and in many instances indicate the texture of the leaf as well as its shape and margin. It would have been helpful for those not acquainted with the technique had Mr. Marx described his procedure in the preparation of the prints.

The plates might possibly have shown up to a better advantage if the labeling had been done with more precision; however, the author may have wished to produce the effect of a student's notebook. The addition of the scientific names of the trees would have made the book more suitable for use in college classes, but for high school or general use this is not necessary.

MARY L. HIXSON
Oklahoma Baptist University
Shawnee, Oklahoma

ANDERSON, EDGAR. *Introgressive Hybridization.* 1st ed. John Wiley & Sons, Inc., New York. ix + 109 pp. illus. 1949. $3.00.

This volume points up an important problem of biology and shows the way for observing biologists to contribute to its solution even though they have little equipment and no access to a laboratory. The problem deals with speciation of living things, how this speciation came about and the methods by which it is now molding living things. It discusses the intimate interrelations between the habitat and the genes accumulated by the living forms which do or are to occupy this environment. It shows how new genes may be introduced into the species by hybridization and be sifted for their fitness.

Introgressive hybridization is a name given to the process when the introduced genes enter the species first through the direct crossing of two dissimilar species and then hybrids breed back for many generations to one or the other of the parent species. Examples of natural experiments of this type are cited in *Iris, Helianthus,*

Lactuca, etc. The book is given over to a discussion of the ecological and genetic bases for this introgression,—its effects on finite population and on evolution, the special techniques thus far developed for its detection and analysis, and on the need for the study of the methods of introgression. With a little practice, all can contribute to these studies by recognizing and recording the peculiarities of plants and locations in ever-varying natural habitats. By the methods outlined, it is possible to apply critical tests and make valid estimates of the part introgression is playing in shaping the living world.

JOHN W. GOWEN,
Genetics Department,
Iowa State College
Ames, Iowa

MAYOR, JAMES W. *A Brief Biology.* The Macmillan Company, New York, 427 pp. illus. 1949. $4.00.

This brief general biology follows in style and method of presentation the more complete and detailed *General Biology* of Mavor. The text has been divided into five major portions, The Nature of Life, Plant Life, Animal Life, Human Anatomy and Physiology, each relatively independant of each other so that the order may be taught at the instructor's discretion. The plan and the sequence of topics is comparable to that of the longer text. Especially fascinating and well written are the ideas and implications presented in the material covering The Development of the Individual, Heredity, Environment and Organisms, Evolution, and Early Man. Unusual to most general biology texts is a rather thorough over all view of life in a fresh water pond with a presentation of some of the relationships between plants and animals.

The comprehensive glossary not only includes the pronunciation of words but also indicates the original derivation of the words. The appendix consists of a synoptic table of the plant and animal kingdoms. The number of pages on which illustrations occur are printed in bold face type in an accurate index. The photographs used are excellent; frequent illustrations from other sources are provided and many diagrammatic drawings are an aid in assimilating the contents of the text. Diagrams to illustrate particular phases of evolution in plants and animals, along with comparative illustrations and charts, help to establish general concepts and relationships.

As a whole, the material is presented in a clear and concise manner with explanations of the different phenomena written for the purpose of easy digestion; however, some chapters seem to be far too technical for the average biology class. More emphasis could be placed on general views and principles with less detail on structural parts, particularly concerning the chapters in part II on plant life and part III on animal life, whose content would be better for general botany or zoology texts respectively. For a course which maintains a laboratory with dissection, these chapters contain enough material to serve as a laboratory guide. *A Brief Biology* can be considered as a text which will stimulate considerable thought for a one semester general biology course. The learning of much of the technical material may or may not be pursued according to the prerogative of the instructor.

RUTH E. GRIFFITH,
The State College of Washington,
Pullman, Washington

DE TURK, E. E. Freedom from Want. Chronica Botanica Co., Waltham, Mass., 1948. *Chronica Botanica*, Vol. 11, No. 4, pp. 207–284. illus. $2.00.

This symposium is a survey of the food needs of the world and the present and future possibilities for meeting those needs. The separate papers, dealing with population and food supply, world soil and fertilizer resources, crop production, animal production, the economics of freedom from want and the obligations of science. The articles are well written and coordinated with each other and with the main theme. The illustrations and tables add much to the usefulness of the book, which includes a wealth of information not easily located elsewhere.

JOHN BREUKELMAN

STERN, CURT. *Principles of Human Genetics.* 1st ed. W. H. Freeman and Co., San Francisco 5, Cal. xi + 617 pp. illus. 1949. $5.50.

Along with an increasing interest on the part of educators, practicing physicians, social and public health workers, and medical students in disease and abnormalities having hereditary significance and social applications, the study of genetics has rapidly become a more important part of the college curriculum. A significant need has developed for a textbook which covers adequately the fundamentals of the mechanism of heredity, and yet devotes the major part of its text matter and illustrations to applications of the laws of heredity to human beings. Dr. Stern has met this need rather well, and has also included much additional material not readily available in many libraries.

The book is for the most part clearly and forcefully written. However, since it does not contain a glossary and (as stated in the preface) was designed to be used also outside college classrooms, a number of technical terms are included which could better have been simplified or omitted. An example of such unnecessarily burdensome terminology may be noted in the discussion of subtypes of color-blindness on Page 213. The book contains 198 illustrations. Included are line diagrams, charts, tables, graphs, type genealogies, and some photo reproductions. A series of thought-provoking problems appears at the close of most chapters, together with a list of selected references. Answers and solutions for the problems are available to instructors who adopt the book for class use. The index is comprehensive and well-arranged.

This text should prove adaptable for college classes and, within certain limitations, should serve as a desirable reference work and as refresher reading for background understanding of many of the daily problems of physicians, educators, public health workers, and social service personnel.

B. BERNARR VANCE
Daniel Kiser High School, Dayton 4, Ohio

GATES, R. RUGGLES. *Pedigrees of Negro Families.* The Blakiston Company, Philadelphia. vii + 267 pp. illus. 1949. $5.50.

This book is largely a presentation and analysis of pedigrees illustrating the inheritance of numerous specific traits in Negro families. More than 200 pedigrees are diagrammed; these were contributed chiefly by students in the United States, and are for their own families or those of their acquaintances. The author states that a great deal of time was spent in conferences with the contributors of the pedigrees in checking relevant points. He thinks the results are as free from errors and gaps as is usual in similar published material.

The number of pedigrees per trait ranges from one to 27. The latter number applies to polydactyly, and of these, 22 seem to be clear-cut dominants, while the other five may be recessives or dominants, with incomplete penetrance. With this character as well as with others the author finds no evidence that inheritance in Negroes is different from that in other races, in spite of the fact that in his recent work *Human Ancestry* (Harvard University Press) he regards Negroes as one of five distinct species of *Homo*. The frequency of certain genes, however, is known to vary greatly from race to race. Differences in gene frequency are of course the basis of racial and subspecific differences, in man as well as in other species.

Two of the chapters deal with traits which Professor Gates considers racial characters. He points out that such differences are often quantitative and depend upon the cumulative effects of several genes. Nevertheless, there is good evidence that genetic segregation occurs among the descendants of human racial hybrids as it does among individuals within a race.

An interesting feature of the book is a color plate reproducing paintings of blocks representing nine grades of human skin color, ranging from "black" to Caucasoid "white."

The book is clearly printed on an excellent grade of slick paper, and is substantially bound in cloth. There is an index. It should prove useful as a reference work in the high school and college library.

EDWARD C. COLIN
Chicago Teachers College, Chicago, Illinois

HUXLEY, JULIAN, *Heredity East and West*, Lysenko and World Science, Henry Schuman, Inc. New York. 246 pp. 1949. $3.00.

Julian Huxley, a Fellow of the Royal Society and an author with an international reputation, has spent the major part of his life studying and teaching genetics and evolution. He has written many books which aptly interpret science for the layman. One of his more recent highly technical books is *Evolution, The Modern Synthesis.* Since he has an extensive scientific background in the field of heredity and an adeptness for expressing technical, scientific problems simply and clearly, he was requested to explain one of the greatest controversies of present times —Lysenkoist (Michurinist) versus Mendelian genetics.

In this easily read book, Dr. Huxley discusses the controversy under the following headings: (1) The Controversy; Its Nature and History; (2) The Ideological Issue; (3) The Scientific Issue; (4) Genetics as a Science; (5) The Totalitarian Regimentation of Thought; (6) The Situation of Science; and (7) Postscripts One, Two and Three (The postscripts include references to published articles and letters which became available after the text of this book was in proof). There are 34 entries, including original reports of Lysenko in the literature-cited section. There is also an index.

The general nature and history of the controversy, which came into outstanding prominence with *The Session of the Lenin Academy of Agricultural Science,* 1948, is discussed in detail. Huxley states, "Neo-Mendelism is the general science of particulate heredity. It has demonstrated that hereditary units postulated by Mendel do actually exist. We now call them *genes.* . . . It has discovered that in all types of organisms so far investigated there exists a material basis of inheritance, a special organ of heredity." Michurinism takes its name from a Russian horticulturist and plant breeder, Michurin, who lived from 1855 to 1935. Lysenko a present day Russian horticulturist has been largely responsible for elaborating the theory which is a version of the general theory of Lamarckism. Huxley included the following quotations from Lysenko's reports: (1) Heredity is "the effect of the concentration of action of external conditions assimilated by the organism in a series of preceding generations." (2) "Changes in heredity are as a rule the result of the organisms' development under external conditions which, to some extent or other, do not correspond to the natural requirements of the given organic form." (3) Lysenko says about "graft-hybrids," "we already have every ground to believe that every graft of a plant in its youthful stage produces changes in heredity." Huxley states, "Many of the results claimed as facts by Michurinites (vegetative hybridization and inheritance of acquired characters) have not proved capable of verification by scientists outside Russia. . . ."

Throughout the book the author attempts to answer such questions as: What are Lysenko's claims? Is he right in condemning Medelian genetics as "bourgeois science"? Why have scientists throughout the world so fiercely attacked the Central Committee for adopting Lysenkoism as official party genetics and for preventing the teaching of Mendelian genetics and doing research pursuant of further facts concerning Mendelian genetics? What is the scientific and political significance of this controversy?

Huxley's closing paragraph follows: "Do we want science to continue as free pursuit of knowledge of control over nature, or do we want it to become subordinate to political theory and the slave of national governments? It is a crucial question on which the general public as well as the professional scientist must make up its mind."

In the reviewer's opinion, every teacher of science, especially of biology, should read and re-read this illuminating discussion of a very serious problem. The reader, especially the teacher, should bear in mind that Lysenkoism is going to be popularized by many pseudo-scientists and that many of the poorly informed general public (the persons who will greatly influence your present and future students) will, in turn, be discussing and perhaps lauding the efforts of Lysenko and his theories. Above all, it is the science

teacher's duty to acquaint students with scientific facts and principles that result from scientific investigation; not to teach theory and fiction as though they were observable truths.

TED F. ANDREWS
State Teachers College,
Emporia, Kansas

FREAR, DONALD E. H. *A Catalogue of Insecticides and Fungicides.* The Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, Inc., New York City. Vol. 1 x + 203 pp. 1947. $6.50. Vol. 2 x + 153 pp. 1948. $5.50.

The scope and purpose of this valuable and highly specialized work are well expressed in the Foreword by Director F. F. Lininger of the Pennsylvania Agricultural Experiment Station. Excerpts from the Foreword, therefore, follow.

"It (the Catalogue) represents the collection and correlation of pertinent facts from a large mass of scientific information, accumulated over a period of years in one field of research, but scattered in many technical publications. Covering as it does the results of biological testing on a group of approximately 10,000 materials, this catalogue should be of wide use to scientists in the field of insecticides and fungicides.

"With the tremendous increase in scientific knowledge, it will be necessary to condense and compile known facts frequently in future years, if the time of the workers is to be used to best advantage. In many cases, the bringing together of known facts is as important a contribution to research as the discovery of new information.

"It is a pleasure, therefore to commend the present catalogue to research workers in entomology, plant pathology, and chemistry. The large amount of time which Dr. Frear has spent in the preparation of these volumes will be more than repaid, in the aggregate, by the saving of effort on the part of many individual students and investigators who will be spared the necessity of long and tedious literature searches."

PHILIP E. FOSS,
Hartford Public High School,
Hartford, Connecticut

PHILIPS, ALFRED W., *The Value of Soil Conservation.* Problems of Conserving Soil, Water, and Wildlife. The University Publishing Company, New York. 64 pp. illustrated. 1949.

Clearly stated problems proving the value of conservation are of utmost importance in creating interest in this vital subject. This well illustrated book with over one-hundred photographs and many other illustrations makes these problems in conservation studies especially attractive. These mathematical exercises are designed to help make a unit on conservation in the graded schools a living practical subject. Examples of some of the all important subjects which are treated are: what erosion does to the land, how strip farming helps to control wind erosion and to conserve moisture, the value and construction of farm ponds for water conservation and wildlife, how crop rotation helps in the soil conservation program, the valuable assets of wildlife, pasture management, and how trees help to control erosion. During the preparation of the book, units of the text were given actual class use and were revised so as to be more suitable. This book should be a valuable addition to the library of any grade school teacher who really desires to stimulate her pupils with conservation ideas.

LOREN W. MENTZER,
University of Nebraska,
Lincoln, Nebraska

Seasonal Changes in Trees. One reel, sound, color or black-and-white; Collaborator: N. E. BINGHAM, School of Education, Northwestern University. Compressed into a few minutes of film time and brought conveniently into your classroom, this picture brings to your class the seasonal story of the changes in trees. It is an excellent introduction to the scientific study of trees, a rich background for reading and language activities about trees, and a splendid base for many study activities, including supervised field trips and field study of trees. Classification, seasonal aspects, and careful observation are stressed throughout the film. (Primary, Intermediate, Junior High, Senior High, Adult).

WHOOPING CRANE INCREASE

Four young whooping cranes have returned with 29 adults to their wintering grounds in Texas, giving the big white birds new headway in their race against extinction, it was reported by John H. Baker, president of the NATIONAL AUDUBON SOCIETY.

The continental whooping crane population now stands at 36, including two captive birds at the Aransas National Wildlife Refuge on the east coast of Texas and one in Louisiana. Efforts to save the remnant of America's tallest bird are being jointly sponsored by the U. S. Fish and Wildlife Service and the National Audubon Society.

Last winter two captive birds, one loaned by the Audubon Park Commission in New Orleans, and the other given to the Audubon Society by the Gothenburg (Nebr.) Rod and Gun Club, mated and built a nest in a specially constructed enclosure at the Aransas refuge. Two eggs were laid, which later proved to be infertile. Another pairing is being encouraged with a different male bird, and it is hoped that they may lay fertile eggs next spring and successfully raise young.

In 1942 the whooping crane population was down to 22 birds. The slow rise in numbers is attributed by the National Audubon Society to increased protection on their wintering grounds and lessened shooting of the cranes, owing to widespread publicity along their migration route.

America's 13th annual National Wildlife Restoration Week, originally established by Presidential proclamation in 1938, will be observed this year during the week of March 19–25, under the sponsorship of the National Wildlife Federation.

Wildlife Week aims to focus the attention of 150 million Americans upon the importance of wildlife conservation to their everyday life and the debt which they owe coming generations to help perpetuate our national resources for future welfare and prosperity.

NOTICE TO CONTRIBUTORS

Manuscripts for publication in THE AMERICAN BIOLOGY TEACHER should be typewritten, on one side only, on standard white paper, 8½ × 11 inch size, with a margin of at least an inch on all sides. The writer should keep a carbon copy for reference and as insurance against loss of the original in transit.

Articles are scheduled for publication in approximately the order of acceptance of the manuscripts. Generally the journal is tentatively arranged about three or four issues ahead, and there are under consideration at any time enough manuscripts for about two or three more issues. Some space is of course allowed for news items and articles of a seasonal nature. On the average, a manuscript submitted this month may expect to find its way into print, if it is accepted promptly, in about May or October. Many seasonal papers have to be postponed an entire year, simply because the author has not allowed the necessary four to six months that intervenes between acceptance and publication.

For details concerning titling, headings, references, illustrations, etc., consult *Preparation of Manuscripts for Publication*, which appeared in the October, 1943, issue of THE AMERICAN BIOLOGY TEACHER. A limited number of reprints is still available; copies may be obtained from the editor.

Manuscripts may be sent to the editor-in-chief or to any one of the associate editors. A complete list of the latter appears in each October and February issue.

To All Readers:

If you enjoy The American Biology Teacher, have some friend send in this application.

THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS

JOHN P. HARROLD, Secretary-Treasurer,
110 Hines Ave., Midland, Mich.

☐ NEW
☐ RENEWAL

I hereby apply for membership in The National Association of Biology Teachers and enclose $2.50* as my annual membership dues $2.00 of which is for a year's subscription to the American Biology Teacher. (Subscription may not be had separately)

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* Outside of United States $3.00.